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EXAMINER	
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ART UNIT	PAPER NUMBER
2482	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/587,939	SASAI ET AL.	
	Examiner	Art Unit	
	HEE-YONG KIM	2482	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 June 2011*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-9 and 12-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-9 and 12-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This office action is in reply to Applicant's Response dated June 28, 2011.

2. **Claims 1, 9, and 17-21** have been amended.

3. **Claims 1, 4-9, and 12-21** are pending.

Response to Arguments

4. Applicant's arguments with respect to the prior art rejection over **claims 1, 4-9 and 12-21** have been considered but they are not persuasive.

5. Regarding **claim 1**, applicant argues (pp.14-16) that Purl fails to disclose the additional information including profile information for specifying whether information (1) (i) an interpolation method for the interpolation frame, (2) a motion detection method , (3) residual information and/or vector difference. Examiner understands that applicant tries to interpret the claim in the light of the specification. However the claim limitation "profile information specifying a combination of information" can be plainly interpreted as a profile information specifying a combination of any information because there is no specifics about information in the "combination of information". So, examiner interprets "profile information specifying a combination of information" as a flag indicating whether there is a residual information or not. Applicant further argues (pp. 16) Puri fails to teach obtaining an interpolation motion vector based on a ratio between (i) a distance in a time axis direction between the decoded image frames and (ii) a distance in a time axis direction from a position of one of the decoded image frames to an interpolation position

of the interpolation frame for interpolating the image frames. Examiner respectfully disagrees. Puri teaches wherein the interpolation frame creation unit (interpolation frames F1 at Fig.2: F1 and F2, Fig.3) obtains an interpolation motion vector (d_{01} and d_{12}, Fig.2) from the second motion vector (d_{02}, Fig.2) based on a ratio (Fig.2 and Fig.3 show interpolation motion vectors are derived from ratio of temporal distances: motion-fields are obtained by scaling the available motion-field, pp.132, left col, line 1-12) between (1) a distance in a time axis direction (2 frames between F0 and F2, Fig.2; 3 frames between F0 and F3, Fig.3) between the decoded image frames and (2) a distance in a time axis direction from a position of one of decoded image frames to an interpolation position of the interpolation frame (One frame in Fig.2; one frame between F0 and F, two frame between F1 and F3 in Fig.3) for interpolating the image frames.

6. Regarding the independent **claims 9, 19 and 21**, applicant argues (pp.17-18) that Purl does not teach *when a difference between an image frame obtained by a motion compensation processing unit using the first motion vector and an image frame to be processed is equal to or greater than a predetermined threshold, the vector difference is provided.* Examiner maintains that applicant has interpreted claims narrowly than it would be. Because the claims cite "additional information includes at least one of (1) residual information, and (2) vector difference", it would have be sufficient to show that Puri discloses that *when a difference between an image frame obtained by a motion compensation processing unit using the first motion vector and an image frame to be processed is equal to or greater than a predetermined threshold, the vector difference is provided* (Motion Compensated interpolation error is coded where it

is significant, pp.131, left col., line 17-19). Applicant further argues (17-18) that Purl, does not teach (1) when a size of a "subtraction signal" is smaller than a predetermined threshold, the present invention encodes an additional information (or decodes encoded additional information) including (A) an interpolation method for the interpolation frame with respect to the image frames, and (B) a motion detection method for detecting the first motion vector, and (2) when the size of the "subtraction signal" is larger or equal to the predetermined threshold, the present invention encodes an additional information (or decodes encoded additional information) including (A) the interpolation method for the interpolation frame with respect to the image frames, (B) the motion detection method for detecting the first motion vector, (C) residual information of the interpolation frame and an image frame corresponding to the interpolation frame, and (D) vector difference between a motion vector of the interpolation frame detected with respect to the image frames and a motion vector of the interpolation frame derived based on the first motion vector with respect to the image frames. Examiner respectfully disagrees. As shown in this office action, the above features are obvious over Puri.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. **Claims 1, 6, 8-9, 13 and 15-21** are rejected under 35 U.S.C. 103(a) as being unpatentable over Puri (Signal Processing Image Communication 2 (1990), No.2) (hereafter referenced as Puri), MPEG inherency supported by Tahara (US 2002/0,080,875).

Regarding **claim 1**, Puri discloses Video Coding With Motion-Compensated Interpolation for CD-ROM Applications. Specifically Puri discloses A decoding device (Fig.7), comprising: a decoding unit operable to decode an encoded image signal (Bitstream, Fig.7) obtained by encoding image frames (Fig.5 CMCI-MPEG encoder) of an image signal and by encoding additional information (MCIE (Motion Compensated Interpolation Error), pp.131 left col., paragraph 2) for creating an interpolation frame (interpolation frames F1 at Fig.2: F1 and F2, Fig.3) for interpolating the image frames based on a first motion vector (d_{02}, Fig.2) that is a motion vector between the image frames (F0 and F2, Fig.2), so as to output decoded image frames of the image signal and decoded additional information;

a motion vector detection unit operable to detect a second motion vector (d_{01} and d_{12}, Fig.2) which is a motion vector between(i) the image frames (F1 at Fig.2) of the encoded image signal which are decoded based on the decoded additional information output from the decoding unit and (ii) the decoded image frames output (Frames F0 and F2 at Fig.2) from the decoding unit; and

an interpolation flame creation unit operable to create an interpolation frame, considering the detected second motion vector as the first motion vector (Second

motion vectors are now considered as motion vectors between the frame to be interpolated (interpolation frames F1 at Fig.2: F1 and F2, Fig.3) and the decoded frames (Frames F0 and F2 at Fig.2)), such that the created interpolation flame is created based on the second motion vector (second motion vector is same as the first motion vector in order to determine interpolated motion vectors d_{01} and d_{12}, Fig.2), the decoded image frames output (Frames F0 and F2 at Fig.2) from the decoding unit which are decoded, and the decoded additional information output from the decoding unit ,

wherein the interpolation frame creation unit (interpolation frames F1 at Fig.2: F1 and F2, Fig.3) obtains an interpolation motion vector (d_{01} and d_{12}, Fig.2) from the second motion vector (d_{02}, Fig.2) based on a ratio (Fig.2 and Fig.3 show interpolation motion vectors are derived from ratio of temporal distances: motion-fields are obtained by scaling the available motion-field, pp.132, left col, line 1-12) between (1) a distance in a time axis direction (2 frames between F0 and F2 in Fig.2; 3 frames between F0 and F3 in Fig.3) between the decoded image frames and (2) a distance in a time axis direction from a position of one of decoded image frames to an interpolation position of the interpolation frame (One frame in Fig.2; one frame between F0 and F, two frame between F1 and F3 in Fig.3) for interpolating the image frames, and creates the interpolation frame based on the interpolation motion vector and the decoded image frames, wherein the additional information includes (ii) a motion detection method (it was well known that motion search range which is sent in the frame header is a property of MPEG video compression) for detecting the first motion vector, wherein (B)

the additional information further includes at least one of (i) residual information (MCIE (Motion Compensated Interpolation Error, pp.131, right col., line 1-3) of the interpolation frame and an image frame corresponding to the interpolation frame, and (ii) a vector difference between a motion vector of the interpolation frame detected with respect to the image frames and a motion vector of the interpolation frame derived based on the first motion vector with respect to the image frames, the interpolation flame creation unit creates the interpolation frame based on information included in the additional information (Fig.6 CMCI estimation circuit).

However, Puri is silent on wherein, (A) when the additional information includes (i) an interpolation method for the interpolation frame with respect to the image frames, (ii) a motion detection method for detecting the first motion vector, and (iii) profile information specifying a combination of information, the interpolation frame creation unit creates the interpolation frame based on information included in the additional information.

However, it was well known in the art (Tahara: Fig.15) that the additional information includes (i) an interpolation method for the interpolation frame with respect to the image frames (It was well known in MPEG video Compression (Tahara: Picture_Coding_Type at Fig.15) that Information regarding Prediction Direction (Forward/Backward/Bi Directional Prediction) is sent in a picture header , (ii) a motion detection method (motion search range which is sent in the picture header (Tahara: forward_f_code and backward_f_code, Fig.15) is a property of MPEG video compression) for detecting the first motion vector. However, Puri fails to disclose

additional information including (iii) profile information specifying a combination of information

Puri further discloses CMCI (conditional Motion Compensated Interpolation) such that residual (motion compensated interpolation error) is only transmitted when it is significant (pp.130-131, principle of CMCI).

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Puri by providing specifically addition information further including the flag (profile information), in order to inform whether there is residual or not. The Puri CMCI coding, incorporating addition information further including the flag (profile information) in order to inform whether there is residual or not, has all the features of claim 1.

Regarding **claim 6**, Puri discloses everything claimed as above (see claim 1). In addition, Puri discloses wherein the additional information (MCIE, pp.131, right col., line 1-3) is information produced for every interpolation frame (quantized and encoded as in single-frame CMCI, pp.132, left col., first paragraph).

Regarding **claim 8**, Puri discloses everything claimed as above (see claim 1). In addition, Puri discloses wherein, when the additional information (MCIE, pp.131, right col., line 1-3) is not included in the encoded image signal, the interpolation frame creation unit creates the interpolation frame (Fig.2 and Fig.3 Frame Interpolation) based on the decoded image frames (Decoded frame F0 and F2 in Fig.2).

Regarding **claim 9**, the claimed invention is the encoder corresponding to decoder described by claim 1. Encoder is the inverse of the decoder. All the features of

claim 9 are obvious over claim 1 except *wherein, when a difference between an image frame obtained by a motion compensation processing unit using the first motion vector and an image frame to be processed is equal to or greater than a predetermined threshold, the additional information further includes at least one of (i) residual information of the interpolation frame and an image frame corresponding to the interpolation frame, and (ii) a vector difference between a motion vector of the interpolation frame detected with respect to the image frames and a motion vector of the interpolation frame derived based on the first motion vector with respect to the image frames.*

However, Puri further discloses *wherein, when a difference between an image frame obtained by a motion compensation processing unit using the first motion vector and an image frame to be processed is equal to or greater than a predetermined* threshold (Motion Compensated interpolation error is coded where it is significant, pp.131, left col., line 17-19)*, the additional information further includes <u>at least one</u> of (i) residual information of the interpolation frame and an image frame corresponding to the interpolation frame (*Motion Compensated interpolation error, pp.131, left col., line 17-19*), and (ii) a vector difference between a motion vector of the interpolation frame detected with respect to the image frames and a motion vector of the interpolation frame derived based on the first motion vector with respect to the image frames.*

Regarding **claim 13**, the claimed invention is the encoder corresponding to decoder described by claim 6. Encoder is the inverse of the decoder. Therefore, it was obvious over Puri.

Regarding **claim 15**, Puri teaches everything claimed as above (see claim 9). Puri teaches embedding the flag (profile information) into the additional information, in order to inform whether there is residual or not (see above claim 3).

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Puri by providing specifically wherein the profile information is included as header information of a stream of the image signal, in order to inform whether there is residual or not. The Puri CMCI coding, incorporating addition information further including temporal position of the interpolation frame and the flag (profile information) embedded into the header in order to inform whether there is residual or not, has all the features of claim 15.

Regarding **claim 16**, Puri teaches everything claimed as above (see claim 9). Puri further discloses wherein, when a residual between an interpolation frame created based on the image frames and the image signal corresponding to the interpolation frame is small, the encoding unit does not encode the additional information (Motion-compensated interpolation error is coded where it is significant, pp.131. left col., paragraph 2).

Regarding **claim 17**, the Puri CMCI coding, incorporating addition information further including the flag (profile information) in order to inform whether there is residual or not, as applied to claim 1, discloses An interpolation frame creating system for creating an interpolation frame (Fig.5 and Fig.6: CMCI MPEG encoder and decoder) which interpolates image frames forming an image signal, comprising:
a first motion vector detection unit operable to detect a first motion vector (d_{02}, Fig.2)

which is a motion vector between the image frames (F0 and F2, Fig.2) of the image signal;

an additional information production unit operable to produce additional information (MCIE (Motion Compensated Interpolation Error), pp.131 left col., paragraph 2; incorporating addition information further including the flag (profile information) in order to inform whether there is residual or not) for creating the interpolation frame from the image frames and creating a motion vector for the interpolation frame, the motion vector being derived (Fig.2 and Fig.3) from the first motion vector based on a ratio between a distance in terms of time between the image frames and a distance in terms of time to an interpolation position of the interpolation frame, based on the first motion vector and the image frames;

an encoding unit (VWL Encode and Multiplex, Fig.5) operable to encode the image frames and the additional information;

a decoding unit (Fig.6) operable to decode the encoded image frames and the encoded additional information so as to output decoded image frames of the image and decoded additional information (incorporating addition information further including temporal position of the interpolation frame and embedding the flag (profile information));

a second motion vector (d_{01} and d_{12}, Fig.2) detection unit operable to detect a second motion vector which is a motion vector between the image frames (F1 at Fig.2) of the encoded image signal which are decoded based on (1) the decoded additional information output from the decoding unit and (2) the decoded image frames output (Frames F0 and F2 at Fig.2) from the decoding unit; and

an interpolation flame creation unit (Fig.2 and Fig.3) operable to create an interpolation frame, considering the detected second motion vector (d_{01} and d_{12}, Fig.2) as the first motion vector (Second motion vectors are now considered as motion vectors between the frame to be interpolated (interpolation frames F1 at Fig.2: F1 and F2, Fig.3) and the decoded frames (Frames F0 and F2 at Fig.2)), such that the created interpolation flame is created based on the second motion vector, the decoded image frames output from the decoding unit which are decoded, and the decoded additional information output (MCIE (Motion Compensated Interpolation Error), pp.131 left col., paragraph 2; incorporating addition information further including embedding the flag (profile information) from the decoding unit ,

wherein the interpolation frame creation unit (interpolation frames F1 at Fig.2: F1 and F2, Fig.3) obtains an interpolation motion vector (d_{01} and d_{12}, Fig.2) from the second motion vector based on a ratio (1:1 in Fig.2 and 2:1 in Fig.3) between (1) a distance in time axis direction(motion-fields are obtained by scaling the available motion-field, pp.132, left col, line 1-12) between the decoded image frames and (2) a distance in a time axis direction from a position of one of the decoded image frames to an interpolation position of the interpolation frame (interpolation frames F1 at Fig.2: F1 and F2, Fig.3) for interpolating the image frames, and creates the interpolation frame based on the interpolation motion vector and the decoded image frames, wherein (A) when the additional information includes (i) an interpolation method (frame position or temporal order of the interpolation frame as shown in Fig.2 and Fig.3 should be sent, in order to derive second motion vectors) for the interpolation frame with respect to the image

frames, (ii) a motion detection method (motion search range which is sent in the frame header is a property of MPEG video compression) for detecting the first motion vector, and (iii) profile information (incorporating addition information further including the flag (profile information) in order to inform whether there is residual or not) specifying a combination of information, the interpolation flame creation unit creates the interpolation frame based on information included in the additional information (Fig.6 CMCI estimation circuit) and

wherein (B) when the additional information further includes at least one of (i) residual information (MCIE (Motion Compensated Interpolation Error, pp.131, right col., line 1-3) of the interpolation frame and an image frame corresponding to the interpolation frame, and (ii) a vector difference between a motion vector of the interpolation frame detected with respect to the image frames and a motion vector of the interpolation frame derived based on the first motion vector with respect to the image frames, the interpolation flame creation unit creates the interpolation frame based on information included in the additional information (Fig.6 CMCI estimation circuit).

Regarding **claim 18**, the claimed invention is an implementation of claim 1 into an integrated circuit. Puri teaches every features of claim 1 and further teaches An integrated circuit device (VLSI, pp.140, left col., last line). Therefore, Puri teaches every features of claim 18.

Regarding **claim 19**, the Puri CMCI coding, incorporating addition information further including the flag (profile information) in order to inform whether there is residual or not, as applied to claim 17, discloses An integrated circuit device (VLSI, pp.140, left

col., last line), comprising:

a first motion vector detection section operable to detect a first motion vector (d_{02}, Fig.2) which is a motion vector between image frames (F0 and F2, Fig.2) of an image signal; an additional information production unit operable to produce additional information (MCIE (Motion Compensated Interpolation Error), pp.131 left col., paragraph 2, incorporating addition information further including temporal position of the interpolation frame and embedding the flag (profile information) in order to inform whether there is residual or not) for creating the interpolation frame from the image frames and creating a motion vector for the interpolation frame, the motion vector being derived (Fig.2 and Fig.3) from the first motion vector based on a ratio between a distance in terms of time between the image frames and a distance in terms of time to an interpolation position of the interpolation frame, based on the first motion vector and the image frames; and

an encoding section (VWL Encode and Multiplex, Fig.5) for encoding the image frames and the additional information.

wherein the interpolation frame creation unit (interpolation frames F1 at Fig.2: F1 and F2, Fig.3) obtains an interpolation motion vector (d_{01} and d_{12}, Fig.2) based on a ratio (1:1 in Fig.2 and 2:1 in Fig.3) between a distance in terms of time (motion-fields are obtained by scaling the available motion-field, pp.132, left col, line 1-12) between the decoded image frames and a distance in terms of time to an interpolation position of the interpolation frame (interpolation frames F1 at Fig.2: F1 and F2, Fig.3) for interpolating the image frames based on the first motion vector, and creates the interpolation frame based on the interpolation motion vector and the decoded image

frames, wherein the additional information includes (i) an interpolation method (frame position or temporal order of the interpolation frame as shown in Fig.2 and Fig.3 should be sent, in order to derive second motion vectors) for the interpolation frame with respect to the image frames, (ii) a motion detection method (motion search range which is sent in the frame header is a property of MPEG video compression) for detecting the first motion vector, and (iii) profile information (incorporating addition information further including the flag (profile information) in order to inform whether there is residual or not) specifying a combination of information, and

wherein, when a difference between an image frame obtained by a motion compensation processing unit using the first motion vector and an image frame to be processed is equal to or greater than a predetermined threshold (Motion Compensated interpolation error is coded where it is significant, pp.131, left col., line 17-19), the additional information further includes at least one of (i) residual information (MCIE (Motion Compensated Interpolation Error, pp.131, right col., line 1-3) of the interpolation frame and an image frame corresponding to the interpolation frame, and (ii) a vector difference between a motion vector of the interpolation frame detected with respect to the image frames and a motion vector of the interpolation frame derived based on the first motion vector with respect to the image frames.

Regarding **claim 20**, the claimed invention is a computer readable medium claim corresponding to the apparatus claim 1. Therefore, it is rejected for the same reason as claim 1.

Regarding **claim 21**, the claimed invention is a computer readable medium claim corresponding to the apparatus claim 19. Therefore, it is rejected for the same reason as claim 19.

9. **Claims 4-5, 7, 12, and 14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Puri, MPEG inherency supported by Tahara, in view of Hosono (US 5,796,438), hereafter referenced as Hosono.

Regarding **claim 4**, Puri discloses everything claimed as above (see claim 2). However, Puri fails to disclose wherein: the motion detection method is included as code information for specifying a combination of parameters of motion detection; and the motion vector detection unit detects the second motion vector based on the parameters of the motion detection specified by the code information.

In the similar field of endeavor, Hosono discloses Method and Apparatus for Interpolating Picture Information. Hosono specifically discloses wherein: the motion detection method is included as code information (full_pel_forward_vector, col.10, line 65-66) for specifying a combination of parameters of motion detection (Full pel or Half pel motion vector, col.10, line 64-67), in order to specify pel or half-pel based motion estimation (col.10, line 64-67).

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Puri by providing specifically full or half pixel motion estimation based on motion detection method (full_pel_forward_vector), in order to specify pel or half-pel based motion estimation. The Puri CMCI coding,

incorporating addition information further including the flag (profile information) in order to inform whether there is residual or not, further incorporating the Hosono full or half pixel motion estimation based on motion detection method (full_pel_forward_vector), has all the features of claim 4.

Regarding **claim 5**, Puri and Hosono disclose everything except wherein, when the motion detection method included in the additional information cannot be performed, the motion vector detection unit detects the second motion vector using a predetermined motion detection method determined in accordance with the motion detection method included in the additional information.

However, it was obvious to one of ordinary skill in the art at the time invention that if half-pel motion detection was indicated but cannot be performed because of computation burden, the pixel accuracy motion estimation can be substituted, in order to reduce computation cost.

Regarding **claim 7**, the Puri CMCI coding, incorporating addition information further including the flag (profile information) in order to inform whether there is residual or not, further incorporating the Hosono full or half pixel motion estimation based on motion detection method (full_pel_forward_vector), as applied to claim 4, disclose wherein the motion detection method in the additional information is information produced for every stream (Hosono: the picture layer, col.10, line 64-67) of the encoded image signal.

Regarding **claim 12**, the claimed invention is the decoder corresponding to encoder described by claim 4. Decoder is the inverse of the encoder. Therefore, it was obvious over Puri in view of Hosono.

Regarding **claim 14**, the claimed invention is the decoder corresponding to encoder described by claim 7. Decoder is the inverse of the encoder. Therefore, it was obvious over Puri in view of Hosono.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to HEE-YONG KIM whose telephone number is (571)270-3669. The examiner can normally be reached on Monday-Thursday, 8:00am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher Kelley can be reached on 571-272-7331. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/HEE-YONG KIM/
Examiner, Art Unit 2482

/CHRISTOPHER S KELLEY/
Supervisory Patent Examiner, Art Unit 2482